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Reducing Pesticide Movement to Surface Water

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REDUCING PESTICIDE MOVEMENT TO SURFACE WATER

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Pesticides (largely herbicides) can be detected in Iowa surface waters---but when found, are usually at very low concentrations (ppb). Concentrations and total herbicide losses to surface waters are often highest in the spring after chemical applications and heavy rains.

Many management practices can be used to help minimize pesticides in Iowa waters. Farmers, dealers, and pesticide applicators may address the issue by focusing only on herbicide management. Other crop management tools are as important and should be considered before changing pest control strategies.

The following checklist may be helpful for farm advisors reviewing options for reducing pesticides in surface waters.

Checklist for Minimizing Pesticides in Surface Water

I. Know your soils---use Soil Surveys and grower experience

A. What are dominant soil types?
--Influences crop production capabilities and limitations

B. Topography of fields/farms/watersheds
--influences susceptibility to erosion and water runoff

C. Conservation needs

II. Managing cropping systems

A. Crop rotations
1. Continuous corn usually results in more insecticide and herbicide use than a corn-soybean rotation.
2. Rotations with small grains and perennial forages use even fewer pesticides.

B. Fit crop to soil capabilities
1. Are permanent pastures, small grains, and forage crops on slopes/fields most susceptible to runoff, erosion and pesticide loss?

III. Managing pests

A. Know pest levels
   1. What species of weeds, insects, and diseases are present?
   2. What are pest populations? Are they high enough to cause economic damage?
   3. What is the distribution of pest infestations?
      Pests, especially weeds and diseases are not always evenly distributed across crop fields. Treating problem areas early can prevent increases in pest populations.
   4. What are alternatives for pest control?
      a. cultural
         --crop or cultivar rotation
         --resistant cultivars
      b. mechanical
         --rotary hoe
         --cultivation
         --mowing
      c. chemical
         --herbicides
         --insecticides
         --fungicides
      d. biological
         --bacterial, e.g., Bt for European corn borer control

IV. Managing pesticides

A. Selecting product
   1. Does it target pest species?
   2. Strongly adsorbed to soil particles?
   3. Low persistence?
   4. Low vapor pressure?

B. Selecting rates
   1. Does pest pressure warrant high/medium/low rates?
   2. Will other control methods be used in addition to pesticides?

C. Application time and method
   1. Broadcast or banded application?
   2. Avoid application before heavy rains if possible.
   3. Can product be incorporated?
   4. Can pesticides be applied only to problem spots?
   5. Avoid spraying herbicides or insecticides next to creeks, rivers, ponds and lakes. Leave a buffer (no-spray) zone.

V. Managing soil erosion (sediment movement) and water runoff

A. Conservation tillage/residue management
Reducing tillage and increasing residue cover decreases soil particle detachment and slows runoff. Water infiltration is often increased in conservation tillage systems.

B. Terraces, contouring, strip cropping
Changing the physical arrangement of crops slows water movement from fields. Terracing prevents most sediment from entering surface waters supplies. Surface water and dissolved pesticides that enter tile inlets in terraces are eventually outlet to surface waters.

C. Using permanent vegetation to slow water and trap sediment
1. Waterways
--perennial grasses in areas where water normally concentrates and moves in a field.
2. Contour buffer strips
--strips of perennial vegetation alternated with wider crop strips, farmed on the contour.
3. Field borders
--band or strip of perennial vegetation next to crop land bordering crops. They often are planted in place of end rows and used for turn strips.
4. Vegetative filter strips
--perennial grasses designed to filter sediment, nutrients and pesticides planted between cropland and bodies of water.